

**REMARKS**

**I. INTRODUCTION**

Applicants have carefully considered the July 25, 2006 Office Action, and the amendments above together with the comments that follow are presented in a bona fide effort to address all issues raised in that Action and thereby place this case in condition for allowance. Claims 20-31 are pending in this application. In response to the Office Action dated July 25, 2006, claim 23 has been amended.

Care has been exercised to avoid the introduction of new matter. Adequate descriptive support for the present Amendment should be apparent throughout the originally filed disclosure as, for example, the depicted embodiments and related discussion thereof in the written description of the specification. Applicants submit that the present Amendment does not generate any new matter issue. Entry of the present Amendment is respectfully solicited. It is believed that this response places this case in condition for allowance. Hence, prompt favorable reconsideration of this case is solicited.

**II. ALLOWABLE SUBJECT MATTER**

The Applicant's appreciate the Examiner's indication of allowable subject matter in claims 22 and 26-29, subject to being rewritten in independent form including all of the limitations of the base claim and any intervening claims, and if the 35 U.S.C. § 112 first paragraph rejection is overcome.

### III. 35 U.S.C. § 112 FIRST PARAGRAPH

Claims 23-29 were rejected under the first paragraph of 35 U.S.C. § 112 for lack of adequate enabling support. Applicants request reconsideration and withdrawal of the rejection in view of the foregoing claim amendments and the following remarks.

The Office Action, at page 2, asserts that the specification “does not reasonably provide enablement for optical frequency spacing of more than 4,680 GHz, e.g., 10,000 GHz.”

The Examiner has the initial burden to establish a reasonable basis to question the enablement provided for the claimed invention, and “must back up assertions of its own with acceptable evidence or reasoning.” *In re Marzocchi*, 439 F.2d 220, 224, 169 USPQ 367, 370 (CCPA 1971). See MPEP § 2164.04. The Office Action provides no evidence or reasoning to back up the assertion that the claimed invention is not enabled for optical frequency spacing of more than 4,680 GHz. Thus, the rejections under the first paragraph of 35 U.S.C. § 112 for lack of adequate enabling support should be withdrawn.

### IV. REJECTIONS UNDER 35 U.S.C. § 102(b) AND 35 U.S.C. § 103(a)

Claims 20, 23, 25, and 30 are rejected under 35 U.S.C. § 102(b) as being anticipated by Akasaka (US 6,292,288).

Claims 21, 24, and 31 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Akasaka (US 6,292,288) in view of Avallone (US 2005/0117839).

Independent claims 20 and 30 recite, in part, “a transmitter outputting signal light in which a plurality of signal channels with an optical frequency spacing of 400 GHz or more but 12.5 THz or less are multiplexed.”

Anticipation under 35 U.S.C. § 102(b) requires that “each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ 2d 1051, 1053 (Fed Cir. 1987).

The Office Action, at pages 2 and 3, asserts that Akasaka discloses widely spaced channel light with an optical frequency of 2.5 THz at FIG. 63, and column 12, lines 45-50. However, Akasaka merely states “FIG. 63 is a view showing Raman gain profile when a wavelength of a sixth channel is a wavelength spaced apart from a fifth channel by 2.5 THz toward the longer wavelength in the Raman amplifier shown in FIG. 60.” Akasaka’s 2.5 THz refers to the wavelength spacing of the pumping channels, and does not teach or disclose the optical frequency spacing of the signal channel. See Akasaka column 21 line 44 through column 22 line 4 for additional discussion of Akasaka’s pumping channels.

Thus, claims 20 and 30 are not anticipated by the prior art, and are not obvious in view of the cited art.

Independent claim 23 recites “an optical frequency spacing between the adjacent pumping channels in the Raman amplification pumping light is not less than 4680GHz.”

The Office Action, at page 3, asserts: “Akasaka discloses an optical frequency of each, pumping channel contained in the pumping light is so set as to locate a peak of Raman gain at an optical frequency different from an optical frequency of each signal channel contained in the signal light (this is inherent to Raman amplification; further, it is disclosed by Akasaka in fig. 14).”

However, FIG. 14 of Akasaka merely shows the frequency spacing between the peak wavelength of pumping light and the peak wavelength of gain. In contrast to Akasaka, the claim

23 term “optical frequency spacing between the adjacent pumping channels in the Raman amplification pumping light” refers to the frequency spacing between signal channels. Further, Akasaka makes each signal channel  $\lambda$  correspond to the gain peak itself, and this configuration is clearly different from the claimed invention. The claimed invention is characterized in that an optical frequency of each pumping channel is so set as to locate a peak of Raman gain at an optical frequency different from a frequency of each signal channel. In other words, as illustrated in FIG. 19 of the Applicant’s specification, each signal channel is not located at the peak of Raman gain spectrum due to each pumping channel, and is located in the wavelength range where the peaks and troughs of Raman gain spectrum are.

The Applicant traverses the Office Action’s assertion of inherency regarding Raman amplification. “In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art.” *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis in original). See MPEP 2112(IV). The assertion of inherency in the Office Action lacks adequate basis in fact and/or technical reasoning, and is traversed by the Applicants.

Additionally, the Office Action, at page 3, asserts that Akasaka, at FIG. 12, discloses 6 nm as a wavelength interval of pumping channels. However, Akasaka does not teach or suggest “an optical frequency spacing between the adjacent pumping channels in the Raman amplification pumping light is not less than 4680GHz,” as required by claim 23.

Thus, claim 23 is not anticipated by the prior art, and is not obvious in view of the cited art.

Under Federal Circuit guidelines, a dependent claim is nonobvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are

contained in the dependent claims, *Hartness International Inc. v. Simplimatic Engineering Co.*, 819 F.2d at 1100, 1108 (Fed. Cir. 1987). Accordingly, as independent claims 20, 23, and 30 are patentable for the reasons set forth above, it is respectfully submitted that all claims dependent thereon (claims 21 and 22; 24-29; and 31 respectively) are also patentable. In addition, it is respectfully submitted that the dependent claims are patentable based on their own merits by adding novel and non-obvious features to the combination.

Thus, dependent claims 21, 22, 24-29, and 31 are not anticipated by the prior art, and are not obvious in view of the prior art.

## **V. CONCLUSION**

It is believed that all pending claims are now in condition for allowance. Applicants therefore respectfully request an early and favorable reconsideration and allowance of this application. If there are any outstanding issues which might be resolved by an interview or an Examiner's amendment, the Examiner is invited to call Applicants' representative at the telephone number shown below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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